Appendix B:

Relevant DPMS and to All Consultant Letters

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Department of Transportation
ENGINEERING DIVISION
Two Capitol Hill, Rm. 226
Providence, RI 02903-1124
PHONE 401-222-2023
FAX 401-222-3435; TDD 401-222-4971

March 20, 2000

To: All Consultants

Subject: Loop Detector Numbering Scheme for TS-2 Controllers

The current specification for TS-2 Controllers and Cabinets calls for an eight slot detector rack which provides for sixteen channels of detection. Under NEMA TS-2 there is no hard wire connection from the detector amplifier rack to the controller phase inputs. A NEMA TS-2 controller always interprets the inputs from the rack in the following manner:

Slot	1	2	3	4	5	6	7	8
Loop Detector No.	3,4	1,2	7,8	5,6	11,12	9,10	15,16	13,14

To simplify the process of building, programming and troubleshooting controller cabinets, the following guidelines should be followed to ensure the loop detector numbers match the default numbers used in the NEMA specifications. We note this procedure may produce gaps in the loop numbering sequence:

1. Adjacent loop detectors must always be on the same relay.

2.Two-channel relays can be used in any slot. The loop detector number is assigned on the basis of the slot used. For example, any loops connected to a two-channel relay in slot 1 must be numbered as loop detectors 3 & 4. Loops connected to a two-channel relay in slot 4 are numbered as loop detectors 5 and 6.

3. Four-channel relays can only be used in even numbered slots. They utilize the outputs assigned to the even numbered slot and the adjacent lower odd-numbered slot. Loop detectors assigned to a four-channel relay in slot 2 can be numbered 1, 2, 3, and 4. A four-channel relay in slot 4 controls loop detectors 5, 6, 7 and 8.The loop detector number is assigned on the basis of which slot is used.

Slot	2	4	6	8
Loop Detector No.	1,2,3,4	5,6,7,8	9,10,11,12	13,14,15,16

4. Both two and four channel amplifiers can be used in a detector rack. The loop detector number is assigned on the basis of which slot is used by the relay.

Attached is an example intersection layout and detector table. The easiest way to manage loop detector numbering is to include a Slot Number column in the detector table. The following discussion is related to the attached example.

The WB approach has three loops. Adjacent loops must be on the same relay to avoid loop crosstalk and false actuations, so these loops must be on a four-channel relay. We have chosen to place this relay in slot 2, and have numbered the loops 1, 2, and 3.

The EB approach has two loops. Because adjacent loops must be on the same relay we have assigned them to a four-channel relay in slot 4 and numbered them as loops 5 and 6.

The N&S loops do not have any adjacent loops. They do not need to be on the same relay. We have a single unused channel on the relay in slot 2 (detector 4) and two unused channels on the relay in slot 4 (detectors 7 & 8). We have chosen to utilize the relay in slot 4, so the loop detectors are assigned the numbers 7 and 8. The detector table lists loops 1, 2, 3, 5, 6, 7 and 8. There is no loop 4 because one channel on the four-channel relay in slot 2 was not used.

Every intersection is different, so many different loop numbering schemes are possible. The above described methodology will help ensure the loop numbering scheme reflects the way controller cabinets are built and the way TS-2 controllers utilize detector rack inputs. Should you have any questions, or require any assistance please contact Traffic Engineering at (401) 222-2694.

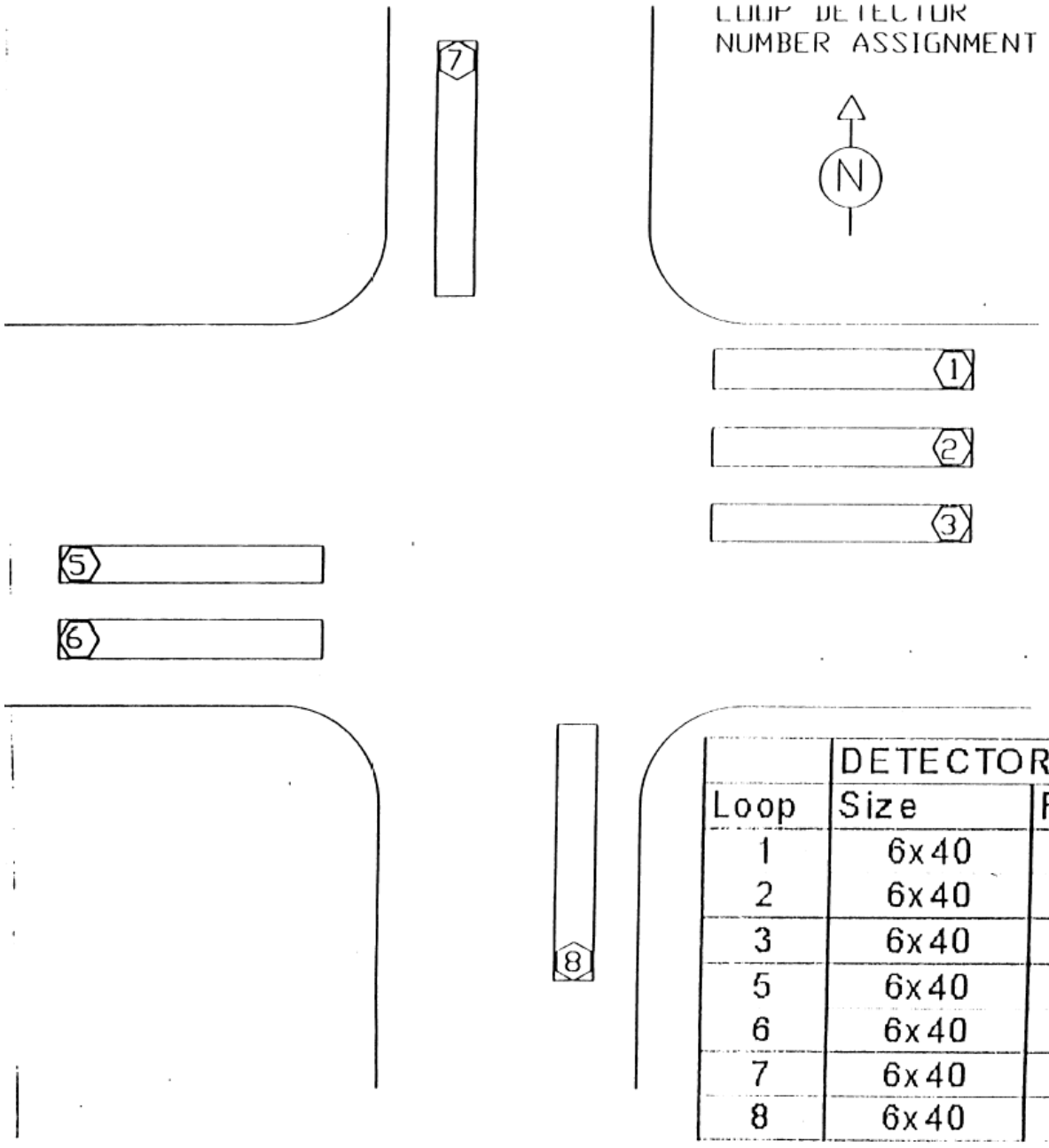
Very truly yours,

Edmund T. Parker, Jr., PE
Chief Design Engineer
Transportation

nm/wp

cc: Messrs. Capaldi, Parker, Bennett, Annarummo, Farhoumand, All Project Engineers; File

LOOP DETECTOR
NUMBER ASSIGNMENT



	DETECTOR		TABLE		
Loop	Size	Relay	Slot	Phase	Delay
1	6x40	1	2	2	3
2	6x40	1	2	2	3
3	6x40	1	2	1	3
5	6x40	2	4	2	3
6	6x40	2	4	2	3
7	6x40	2	4	3	8
8	6x40	2	4	3	8

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May 4, 2001

To All Consultants:

Subject: Traffic Signal Phase Sequence

Design consultants should be aware the vehicle movement numbering convention (odd numbered lefts, even numbered thrus) used for analyzing signalized intersections only matches the NEMA phase numbering scheme for a dual ring, quad left operation. It is not compatible with single ring or other dual-ring and multiple ring operations.

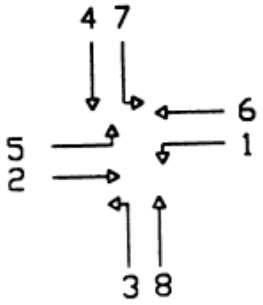
When evaluating intersection phasing single-ring, sequential is the preferred configuration. Dual ring or multi-ring operation should only be used if it is necessary to provide a special phase sequence or it will provide a more efficient operation. The phase sequence of each ring shall be shown in the Phase Sequence Diagram. If the phase sequence changes on a time-of-day basis, the ring structure and phase sequence for each time period must also be shown on the project plans.

Please distribute as necessary. Sample Phase Sequence Diagrams are shown on the attached sheet. Should you have any questions, please contact Theodore Coleman in the Department's Traffic Engineering Unit at 222-2694 x4203.

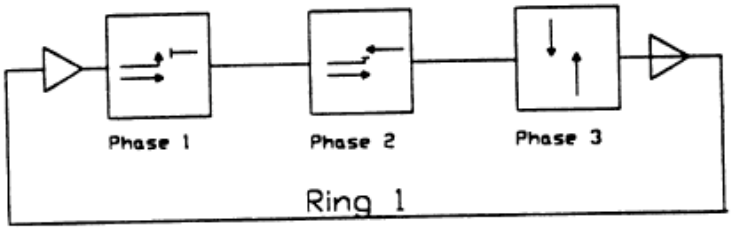
Sincerely,

Edmund T. Parker, Jr., PE
Chief Design Engineer
Transportation

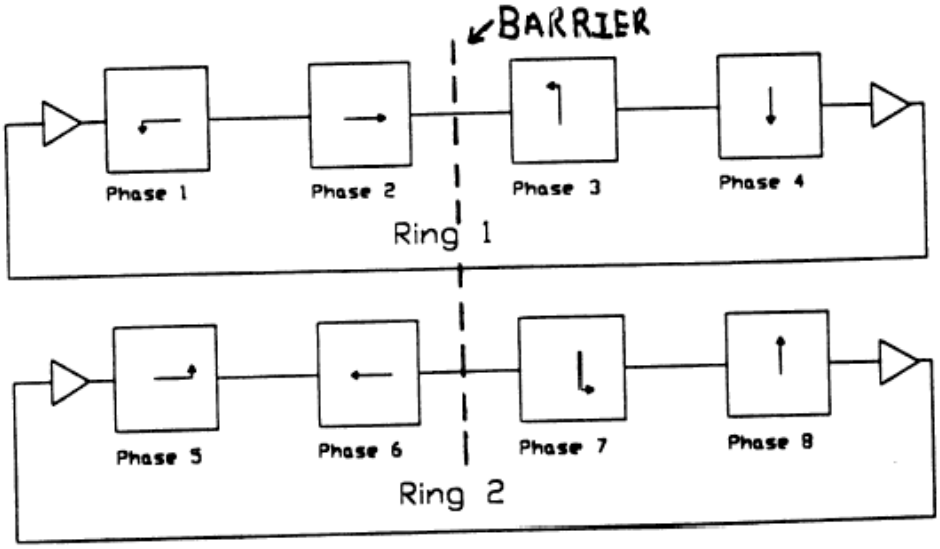
Movement Numbering Convention



PHASE SEQUENCE DIAGRAMS



Single Ring Operation



Dual-Ring Quad-Left